

### REMARKS/ARGUMENTS

Favorable reconsideration of the present application is respectfully requested.

New Claim 14 has been introduced. Claim 1 has been amended so as to depend from Claim 14 and Claim 2 has been amended so as to depend from Claim 1. Claims 10-13 have been allowed and Claim 6 has been indicated as being allowable, subject to overcoming a rejection under 35 U.S.C. § 112. Accordingly, all of the Claims have been allowed over the prior art, other than Claims 7, 14 and their dependent claims. Applicants respectfully submit, however, that Claims 7 and 14, and their dependent claims, also define over the prior art.

Claims 1-3 were rejected under 35 U.S.C. § 103 as being obvious over Williamson et al. (USP 5,930,433) in view of Xu et al. (USP 6,306,563). Claims 1-3 now depend from new Claim 14 which is believed to clearly define over these references.

Claim 14 recites a beam collecting device which combines a semiconductor laser array and a laminated optical waveguide array, for example the semiconductor laser array 10 and the laminated optical waveguide array 20 described in the non-limiting illustrated embodiment. In the claimed beam collecting device, the semiconductor laser array 10 has a plurality of laser emitting parts which are arranged in fast and slow axis directions in a plane normal to the traveling direction of the emitted laser beams and which are grouped into plural groups separated in the slow axis direction. The laminated optical waveguide array 20 may be composed of a plurality of optical waveguides arranged in the slow axis direction to be in alignment respectively with the plural groups. Additionally, like in the allowable Claim 10, Claim 14 recites that each of the optical waveguides is provided with beam collecting means such as the lenses 22a-22e at an incidence surface thereof, so that laser beams emitted from the laser emitting parts of each group in the fast axis direction can be collected toward a predetermined position, thereby to emit the collected laser beams from an emission surface of each optical waveguide 20.

Williamson et al. teaches laminating or stacking optical waveguides which appear to be laminated in a direction perpendicular to the image scanning direction, but does not collect a plurality of beams toward a predetermined position. Rather, the optical waveguide in this prior art can compress a large input image into a smaller output image **but does not provide beam collecting means** such as lenses at an incidence surface of each waveguide. Claim 14 recites that the claimed beam collecting means functions to collect a plurality of beams emitted from beam emitting parts which belong to the same group as the waveguide. Since Williamson et al. lacks an element which provides the claimed function, new Claim 14 clearly defines over this reference.

Xu et al. was cited for the limited teaching of spacer members having a low refractive index. It does not teach a laminated optical waveguide array composed of a plurality of optical waveguides arranged in a slow axis direction to be in alignment respectively with the plural groups, *each of the optical waveguides being provided with beam collecting means* at an incidence surface thereof for collecting laser beams emitted from the laser emitting parts of each group in the fast axis direction toward a predetermined position, and so Xu et al. cannot overcome the shortcomings of Williamson et al. The claims therefore define over any combination of Williamson et al. and Xu et al.

Claims 7 and 9 were rejected under 35 U.S.C. § 103 as being obvious over Beach et al. (USP 5,307,430) in view of Ventrudo (USP 6,240,119). Claims 7 and 9 recite refraction means by which the beam can enter into an optical fiber at a gentle angle relative to the axis of the optical fiber. For example, the refraction means can comprise a concave waveguide emission surface (Fig. 11(A)); a concave optical fiber incident surface (Fig. 13(A)); a convex waveguide emission surface (Fig. 14(A)); a filler between the emission surface of the waveguide and the flat incident surface of the optical fiber (Fig. 14(B)); or a filler between the emission surface of the waveguide and the convex incident surface of the optical fiber

(Fig. 14(B)). Thus, a larger number of laser beams can be collected by each optical waveguide 20, but the incident angle of the collected laser beams to the incident surface of the optical fiber 30 can be diminished so that beam collecting efficiency can be enhanced.

The Examiner has not alleged that Beach et al. discloses refraction means by which the beam can enter into an optical fiber at a gentle angle relative to the axis of the optical fiber. Instead the Examiner has stated that the lens 24 in Ventrudo teaches the claimed refraction means. However, lens 24 does not provide the same function as does the claimed refraction means. Instead, Ventrudo's lens 24 provides the function of the optical waveguide 20 of the invention since, like the presently disclosed optical waveguide 20, it simply collects beams to an optical fiber 31 (col. 4, lines 40-45). Neither provides the function of diminishing the angle which the beam refracted at an incident surface of said optical fiber makes with the axis of said optical fiber in comparison with the angle which the beam before being refracted at said emission surface of an optical waveguide makes with the axis of said optical fiber. Thus the claimed function is missing in Ventrudo, and so this reference cannot teach providing the claimed refraction means in Beach et al..

Additionally, the claimed invention is directed to solving a problem involved in transmitting beams from an optical waveguide to an optical fiber. On the contrary, Ventrudo does not use an optical wave guide and therefore does not purport to solve the problem involved in beam transmission from an optical waveguide to an optical fiber. Those skilled in the art thus would not have been motivated by Ventrudo to provide the claimed refraction means in Beach et al., and so no combination of the above references would render the claims obvious.

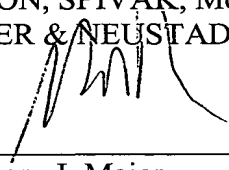
The specification and claims have been revised in light of the objections thereto. The rejection under 35 U.S.C. §112 is therefore believed to be moot.

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Reply to Office Action of March 16, 2004.

Applicants therefore believe that the present application is in a condition for allowance and respectfully solicit an early notice of allowability.

Respectfully submitted,

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